

**Program Charter
for
Coasts, Estuaries, and Oceans**

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1. EXECUTIVE SUMMARY

Program Description

The coasts, estuaries, and oceans www.ppi.noaa.gov/weather_water/CEOPage.html are critical to the economic, social, and ecological vitality and security of our Nation. The coastal zone houses over 60% of the population, contributes over \$724B in revenue, provides 13 million jobs, and is the recreational destination to 180 million visitors annually. This area of land and offshore water also contains sensitive ecological habitats and natural resources (e.g., salmon and oyster fisheries), which are vulnerable to weather and water changes and related environmental effects. These regions require sufficient coastal and ocean observations and predictions to plan for and respond to hazardous weather, water, and related environmental events. Even seemingly minor weather and water changes, when coupled with human-induced effects, can create serious water quality and environmental risks. Resource and emergency managers, decision-makers, and the public require access to more comprehensive, accurate, timely, and accessible weather and water information and services to plan, make sound decisions, and respond effectively.

Currently, the National Oceanic and Atmospheric Administration's (NOAA) Weather and Water (W&W) products and information for the coasts, estuaries, and oceans are less accurate and less dense than inland due to complex physical interactions at the air-ocean-land interface. The lack of integration among existing data products, in addition to the insufficient spatial and temporal resolution of coastal observations, results in lower quality coastal, estuarine, and oceanographic analyses and predictions. Greater integration of data streams is required to represent more effectively the range of impacts from coastal hazards. Integration (i.e., the discovery of, access to and incorporation of disparate data sets into information, products, and services) is essential to address potential incompatibilities among observational data and to facilitate access via a NOAA-wide dissemination mechanism. These data provide the basis for deriving information essential to complex and critical decisions that affect lives, property, and resources. To ensure managers and first responders are able to understand and apply these data to priority issues, it is essential that NOAA develop decision support tools, methodologies, and associated training materials that convey expertise to a broader community and increase understanding at the local, state, and regional levels. These needs are supported by the Requirement Drivers described in Section 2.

The mission of CEO is to provide coastal services that ensure the nation's coastal communities and maritime users have the capability to understand their risk and mitigate their vulnerability from coastal inundation, storms, and related natural phenomena.

To this end, the CEO program will provide **(a)** information, products and services for the nation's coastal communities and maritime users in risk and vulnerability mitigation from coastal natural phenomena; **(b)** coastal and oceanic data in support of forecasts and numerical predictions and **(c)** tools and data in support of coastal and oceanic resource stewardship, usage, and health. The CEO program will connect our national coastal community and decision makers to national, state, and local information using the following strategies:

1. Collect and make accessible coastal and ocean observation data.
2. Collaborate to address model development.
3. Emphasize technology transfer to applications and operational products and services
4. Develop and deliver user-driven decision support tools.
5. Coastal Services delivery to build the capacity of the nation's coastal communities through outreach, education, training, dissemination, data access, and tool development.

Geographic Extent:

The geographical extent of CEO with respect to risk and vulnerability of coastal communities and strategies for implementation is nation-wide from the coastal watershed to the coastal ocean, and for some Hurricane Program forecast services extend globally. CEO also provides *in situ* oceanographic observations, and technical support and leadership in NOAA's operational coastal and ocean observing infrastructure.

II. PROGRAM REQUIREMENTS

A. Requirement Drivers:

1. **Legislative Mandates** directing NOAA to invest in development and operation of warning systems include:
 - i. **Inland Flood Forecasting and Warning System Act of 2002, 15 U.S.C. ' 313c, Pub. L. 107-253, Oct. 29, 2002, 116 Stat. 1731.** - Authorizes NOAA, through the United States Weather Research Program, to conduct research and development, training, and outreach activities relating to inland flood forecasting improvement, and for other purposes.
 - ii. **Coastal Zone Management Act:** Directs the Secretary of Commerce to establish a program of technical assistance for the state and local governments to assist in coastal resource decision-making, including for issues related to coastal hazards. This is a driver for CEO's role in providing decision support tools, outreach, and training activities related to risk and vulnerability mitigation.
 - iii. **National Weather Service Organic Act, 15 U.S.C. ' 313.** - Sets forth the primary duties of the National Weather Service, including the requirements that the Secretary of Commerce shall: forecast the weather; issue storm warnings; display weather and flood signals for the benefit of agriculture, commerce, and navigation; gauge and report the flow of rivers; maintain and operate the seacoast telegraph lines and collect and transmit marine intelligence for the benefit of commerce and navigation; report temperature and rain-fall conditions for the cotton

interests; display of frost and cold-wave signals; distribute meteorological information in the interests of agriculture and commerce; and take the meteorological observations that may be necessary to establish and record the climatic conditions of the United States, or that are essential for the proper execution of the foregoing duties.

iv. **Hydrographic Services Improvement Act of 1998, 33 U.S.C. ' 892 *et seq.*** - This Act clarifies some of the responsibilities and authority of the NOAA Administrator for NOAA navigation programs. The Act directs that NOAA shall acquire and disseminate hydrographic data, promulgate standards for such data and services (and help develop international standards), ensure comprehensive geographic coverage of hydrographic services, maintain a national database of hydrographic data, and provide hydrographic services in uniform and easily accessible formats, by contracting with private entities and other appropriate means. 33 U.S.C. ' 892a(a). It provides that the Administrator, to fulfill these functions, may procure equipment, vessels, and technology necessary to ensure safe navigation and maintain expertise, and may enter into contracts and other agreements with qualified entities. It authorizes the Administrator to design and install the Physical Oceanographic Real Time Systems (PORTS) where appropriate.

v. **Coast and Geodetic Research Act, 33 U.S.C. " 883a - 883i.** - This Act provides the basis for NOS navigation service programs. Sec. 883a authorizes the Secretary of Commerce to conduct hydrographic and topographic surveys, tide and current observations, geodetic-control surveys, field surveys for aeronautical charts, and geomagnetic, seismological, gravity, and related geophysical measurements to provide charts and other information for safe marine and air navigation. This information is collected, analyzed, assimilated, and distributed by DOC. The National Ocean Service [NOAA] is designated as the central depository for geomagnetic data, and the Secretary is authorized to collect, correlate and disseminate such data. The Act authorizes the Secretary to conduct developmental work for the improvement of surveying and cartographic methods and instruments and to conduct investigations and research in geophysical sciences. The Secretary is authorized to enter into cooperative agreements with states, federal agencies, public or private organizations or individuals, for surveying, mapping and publication activities, and to contract with qualified organizations for National Geodetic Survey functions. The Act provides for a permanent authorization of appropriations.

The language in the Act is generally permissive: The Secretary is Authorized to do various functions. But the statute, passed in 1947, stated as its purpose – to define the functions *and duties* of the Coast and Geodetic Survey, and for other purposes. And the nature of the functions and duties (examples include mapping of coastal areas; observations, analysis and prediction of tide and current data; serving as a central depository of the U.S. Government for geomagnetic data) indicates these activities are more than discretionary.

By Department Organization Order 25-5A (now found in DOO 10-15), the Secretary designated his functions under this authority to the NOAA Administrator.

vi. **FEMA National Response Plan** - The National Response Plan establishes a comprehensive all-hazards approach to enhance the ability of the United States to manage domestic incidents. The NRP tasks the Department of Commerce (DOC) with acquiring and disseminating weather data, forecasts, and emergency information, providing information on natural resources, predicting pollution movement, and providing information on meteorological, hydrological, ice, and oceanographic conditions. This is a driver for CEO's

role in providing observations, products and services in support of risk and vulnerability mitigation.

vii. **Public Law 107-77** - Directs the National Ocean Service to establish a Coastal Observation Technology System, “which shall provide a national framework, technical assistance, and support for sustained coastal observation systems.”

B. Mission Requirements:

- Provide physical observations, particularly related to mitigating the effects of coastal hazards, identified in the IOOS Implementation plan as outlined in the National Weather Service Organic Act and FEMA National Response Plan.
- Provide coastal decision makers with integrated operational forecasts for coastal inundation (i.e., from storm surge, Tsunamis, or freshwater inflow) and other coastal watershed conditions (e.g., water level, temperature, salinity) as outlined in the Inland Flood Forecasting and Warning System Act, and the National Weather Service Organic Act..
- Provide new or enhanced observations, products and technologies that provide broad geographic coverage, to support coastal hazard management applications as outlined in the Inland Flood Forecasting and Warning Act and the Coast and Geodetic Research Act.
- Provide coastal weather and water related (particularly for coastal hazards) products that are easily accessible and provide value added information for decision making by coastal and emergency managers (e.g., Geographic Information Systems, online mapping applications, other online formats that synthesize data and information) as outlined in the Coastal Zone Management Act, FEMA National Response Plan, and Hydrographic Services Improvement Act.
- Provide Coastal Services to ensure coastal decision makers have the capability to understand and utilize NOAA products in order to plan for, respond to, and mitigate impacts from coastal hazards as outlined in the Coastal Zone Management Act and the Inland Flood Forecasting and Warning System Act.

III. LINKS TO THE NOAA STRATEGIC PLAN

A. **Goal Outcomes:** CEO supports all four of the major mission goals by collecting and making accessible coastal and ocean observation data, as well as developing coastal products and services in support of community risk and vulnerability. Specific outcomes for each mission goal include:

- **Ecosystem Mission Goal Outcome:** *Healthy and productive coastal and marine ecosystems that benefit society.*
- **Climate Mission Goal Outcome:** *A predictive understanding of the global climate system on time scales of weeks to decades with quantified uncertainties sufficient for making informed and reasoned decisions.*
- **Weather and Water Mission Goal Outcomes:** *Reduced loss of life, injury, and damage to the economy; Better, quicker, and more valuable weather and water information to support improved decisions; and Increased customer satisfaction with weather and water information*

and services.

- **Commerce and Transportation Mission Goal Outcome:** *Safe, secure, and seamless movement of goods and people in the U.S. transportation system.*

B. Goal Performance Objectives: To appropriately support the above mission goal outcomes, CEO employs the strategies listed in the next section to pursue the following performance objectives:

- **Ecosystem Mission Goal:**

1. Increased number of coastal communities incorporating ecosystem and sustainable development principles into planning and management.

- **Climate Mission Goal:**

1. Improved climate predictive capability from weeks to decades, with an increased range of applicability for management and policy decisions.
2. Reduced uncertainty in climate projections through timely information on the forcing and feedback contributing to changes in the Earth's climate.

- **Weather and Water Mission Goal:**

1. Increase lead time and accuracy for weather and water warnings and forecasts.
2. Improved predictability of the onset, duration, and impact of hazardous and severe weather and water events.
3. coordination of weather and water information and services with integration local, regional, and global observation systems.
4. Increased application and accessibility of weather and water information as the foundation for creating and leveraging public (i.e., Federal, state, local, tribal), private and academic partnerships.
5. Reduced uncertainty associated with weather and water decision tools and assessments.
6. Enhanced environmental literacy and improve understanding, value, and use of weather and water information and services.

- **Commerce and Transportation Mission Goal:**

1. Enhanced navigational safety and efficiency by improving information products and services.

C. Goal Strategies: CEO employs the following mission goal strategies to support mission goal performance objectives and outcomes by:

- **Ecosystem Mission Goal:**

1. *Building and advancing the capabilities of an ecological component of the NOAA global earth observing system to monitor, assess, and predict national and regional ecosystem health.*

- **Climate Mission Goal:**

1. Improving the quality and quantity of climate observations, analyses, interpretation, and archiving by maintaining a consistent climate record and by improving our ability to determine why changes are taking place.

- **Weather and Water Mission Goal:**

1. Improving the reliability, lead-time, and effectiveness of weather and water information and services that predict changes in environmental conditions.

2. Working with private industry, universities, and national and international agencies to create and leverage partnerships that foster more effective information services.

3. Employing scientific and emerging technological capabilities to advance decision-making support services and educate stakeholders.

4. Develop and infuse research results and new technologies more efficiently to improve products and services, streamline dissemination, and communicate vital information more effectively.

- **Commerce and Transportation Mission Goal:**

1. Expanding and enhancing advanced technology monitoring and observing systems, such as weather and oceanographic observations, ice forecasts and nowcasts, hydrographic surveys, and precise positioning coordinates, to provide accurate, up-to-date information.

2. Developing and applying new technologies, methods, and models to increase the capabilities, efficiencies, and accuracy of transportation-related products and services.

3. Developing and implementing sophisticated assessment and prediction techniques, products, and services to support decisions in aviation, marine, and surface navigation efficiencies; coastal resource management; and transportation system management, operations, and planning.

IV. PROGRAM OUTCOME(S)

A. Improve predictive and response capability for hazardous coastal and ocean water conditions and their impacts for federal, state, and local level managers.

V. PROGRAM ROLES AND RESPONSIBILITIES

This program is established and managed with the procedures established in the NOAA Business Operations Manual (BOM). Responsibilities of the Program Manager are described in the BOM. Responsibilities of other major participants are summarized below:

A. Participating Line Office, Staff Office, and Council Responsibilities:

1) The National Ocean Service (NOS) is responsible for implementation of NOAA's Integrated Ocean Observing System (IOOS) by providing enhanced national and regional coastal observation networks and support for Regional Associations and Ocean US. NOS is

responsible for models (e.g., circulation models) and decision support tools that effectively integrate coastal observations and increase the efficient use of spatial data. NOS provides outreach to CEO's partners, training to build capacity among CEO product users, and dissemination of CEO products.

2) NOAA's National Weather Service (NWS) is responsible for the overall management and execution for the establishment of NOAA's Integrated Ocean Observing System (IOOS) Data Assemble Center (DAC). NWS is responsible for operating the NDBC Ocean Observing Systems (NOOS) (provides essential in situ oceanic and coastal observations), operations and maintenance of NOAA Telecommunications Gateway (to ensure communications support for observations) and links to NOAA's operational weather warning systems and infrastructure. NWS is also responsible for providing Marine Services functions through their coastal Weather Forecast Offices and the Hurricane Program through the National Hurricane Center and the Tropical Prediction Center.

3) The Office of Atmospheric Research (OAR) is responsible for research to understand the risks and vulnerabilities of the nation's coastal communities and maritime users from coastal natural phenomena, for research to develop mitigation strategies, and for research to develop tools and data in support of coastal and oceanic resources stewardship, usage and health.

4) The National Environmental Satellite, Data, and Information Service (NESDIS) is responsible for continuing existing and developing new services and capabilities for satellite ocean remote sensing and telemetry service (e.g., GOES High Data Rate capability). NESDIS satellite data and products contribute to the satellite data component of the IOOS national backbone. NESDIS supports CEO outreach and education through the building of capacity for the use of satellite data.

5) NOAA Marine and Aircraft Operations Office (NMAO) is responsible for managing NOAA's platform resources to meet both NOAA program operations and maintenance and research requirements.

6) The NOAA Office of General Counsel (GC) is responsible for providing legal services necessary to enable the program to discharge its duties. In this regard, NOAA GC provides a variety of specific services on an as-needed basis, including but not limited to: advice on legal issues related to program responsibilities; review and clearance of agreements, testimony, correspondence, and other documents; legal representation; assistance with litigation and requests for testimony or information; and coordination on behalf of the program with the Department of Commerce GC in the areas of contract, grant, intellectual property, labor and employment, appropriations, legislation and regulation, grant, litigation, and telecommunications law.

7) The NOAA Ocean Council (NOC) is established as the principal advisory body to the Administrator and coordination body for the agency's ocean activities and interests, including open ocean, near shore, coastal, estuarine and Great Lakes activities. The NOC is also authorized to develop a strategy and serves the agency focal point for responding to and implementing the recommendations of the President's Ocean Action Plan.

8) Other Councils (e.g., NOAA Observing Systems Council, Chief Financial Officer, Chief

Information Officer, Education, Research) are responsible for providing policy guidance and frameworks within which CEO can operate to resolve issues in observations, modeling, and tool development in the region from coastal watersheds to ocean.

B. External Agency/Organization Responsibilities

- 1) State and local governments -- are the primary users of products and services, and thus determine the specific requirements for CEO products and services, e.g., state emergency management agencies, state coastal management agencies. In addition to product and service users, they also serve as partners.
- 2) Federal agencies -- FEMA, USGS provide data and expertise that must be leveraged to achieve CEO outcomes. For example, the USGS maintains the national stream gauge network; these data are valuable inputs to any flooding and inundation scenario models operated by NOAA and others. In addition, organizations like the US Coast Guard, ONR and NASA contribute to CEO outcomes. The Coast Guard provides vessel time to support the operation and maintenance of CEO observing systems. ONR and NASA fund NOAA research that is focused on achieving CEO goals and objectives.
- 3) Regional observing systems, or observatories -- provide densification of the data that creates a more highly resolved "picture" of coastal conditions for forecasts and other products and services. Together with the observations collected through CEO (in situ and remotely sensed), these regional observing systems help form the NOAA contribution to IOOS.
- 4) Academic Institutions – Conduct NOAA-supported research that supports CEO goals. This includes R&D for new observing system technologies and new modeling approaches. For example, moving to a community modeling approach should be done in conjunction with academic researchers.
- 5) Regional Associations – Provide governance for regional coastal ocean observing systems, including understanding the needs of observing system users and ensuring that those needs are met. Regional Associations will articulate user needs, and determine the most efficient methods for delivering the data, information, products, or services that those users require. The mechanisms for flowing information back and forth will involve the National Federation of Regional Associations and the Ocean.US office.
- 6) Sea Grant Extension, National Estuarine Research Reserve Educators, Warning Coordination Meteorologists – on the state and local level, provide dissemination, training, and capacity-building for the nation's coastal communities in risk and vulnerability impacts from natural phenomena.

VI. END USERS OR BENEFICIARIES OF PROGRAM

1. Academia – Integrated Ocean Observing System (IOOS) data will be used by university researchers with interests in coastal regions. Academic scientists and researchers are a primary user of oceanographic data, both in the short term and long term. Scientific understanding gained over the long term can help better predict coastal phenomena that directly affect coastal communities.
2. General Public – The ultimate beneficiary in terms of lives, property, and resources

protected through improvements in marine services and hurricane forecasts.

3. Coastal Decision Makers – They have to make the choices that will mitigate the effects of coastal hazards. Thus, the coastal decision maker will be an end user of the data, information, and products that help inform those choices.

4. Regional Associations (RAs) and Regional Coastal Ocean Observing Systems (RCOOS) – RAs and RCOOSs benefit by receiving funding and guidance for their planning and implementation in support of IOOS, and also benefit from the baseline observations of the “national backbone.” RA’s and RCOOS provide the regional component of the “national backbone,” thus providing for a complete IOOS.

5. FEMA – is the primary recipient of improved products and services that relate to forecast and decision-support tools regarding coastal community risk and vulnerability.

6. NOAA – NOAA is a “high level” user and beneficiary, primarily due to the requirements for timely weather predictions and safe navigation:

- NOAA researchers use coastal and oceanic observations provided by CEO
- Weather Forecast Offices (WFO's) produce forecasts using CEO's coastal and oceanic observations, models and modeling products
- Sea Grant and Coastal Zone Management Programs (CZM) use CEO observations, decision support tools, and models/modeling products as part of their outreach and extension activities and CZM conduct extension activities and (in the case of CZM programs) make land-use decisions.